

## CLAIMS:

1. A device (1) comprising a sensor element (5, 31, 32, 33, 71) having biomolecular binding sites (5a) for a biomolecule (6a), characterised in that the device (1) comprises: a remote power transmission element (3, 101), a resonance circuit, said resonance circuit comprising an resonance frequency determining sensor element (5, 31, 32,) or being  
5 electrically coupled to a resonance frequency determining sensor element (33, 71), wherein binding at the binding sites (5a) effects a physical property (R, L, C, mass) of the sensor element (5, 31, 32, 33, 71) and thereby the resonance frequency (f), and a circuit for RF communication of an RF signal (RF) in dependence of the resonance frequency of the resonance circuit.
- 10 2. A device as claimed in claim 1, characterised in that the remote power transmission element comprises a photodiode (3).
3. A device as claimed in claim 1, characterised in that the remote power  
15 transmission element comprises a coil (101) for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonance frequency.
4. A device as claimed in claim 1, characterised in that the sensor element (5, 31,  
20 32) forms a part of the resonance frequency circuit.
5. A device as claimed in claim 4, characterised in that the sensor element (33, 71) forms part of a voltage or current supplying circuit, coupled to the resonance circuit, wherein the voltage (V) or current (I) of the supplying circuit is dependent on a physical  
25 property (R) of the sensor element, and the resonance frequency (f) of the resonance circuit is dependent on said voltage (V) or current (I).

6. A device as claimed in claim 1 or 4, characterised in that the sensor element (71) is a GMR magnetoresistive element.

7. A device as claimed in claim 3 or 4, characterised in that the sensor elements  
5 are resistive elements provided in a bridge configuration.

8. A device as claimed in claim 2, characterised in that the sensors elements are located on the surface of an on-chip SAW/BAW (Surface Acoustic Wave/Bulk Acoustic Wave) resonator which is part of the oscillator circuit.

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9. A method for detecting biomolecules in samples using a device (1) comprising a sensor element (5, 31, 32, 33, 71) having biomolecular binding sites (5a) for a biomolecule, characterised in that a sensor device is used comprising a remote power transmission element (3), a resonance circuit comprising an resonance frequency determining sensor  
15 element (5, 31, 32), or being electrically coupled to a resonance frequency determining sensor element (33, 71), wherein binding at the bonding sites effects a physical property of the sensor element (5, 31, 32, 33, 71) and thereby the resonance frequency, and a circuit for RF communication of an RF signal in dependence of the resonance frequency, the method comprising the steps of:

- 20 a) Binding a target to binding sites of the sensor element  
b) Remotely sending power to the remote power transmission element for powering the biosensor device  
c) recording the RF signal emitted by the circuit for RF communication.

25 10. A method as claimed in claim 9, characterised in that the remote power transmission element comprises a photodiode (3) and in step b light (2) is shone on the photodiode.

30 11. A method as claimed in claim 9, characterised in that the remote transmission element comprises a coil (101) for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonance frequency and in step b an RF frequency corresponding to the RF frequency of the remote power transmission element is emitted.

12. A system for detecting biomolecules in samples provided on a biosensor device, which system comprises the biosensor device and a reader station comprising a power transmitting element for transmitting power to the biosensor device and an antenna and a receiver for receiving of signals to be wirelessly transmitted from the biosensor device to the reader station with a transmitting frequency, characterized in that:

- a device as claimed in any of the Claims 1 to 8 is present,
- the apparatus comprises or is connected to an analyser for analysing the transmitting frequency of the signal of the biosensor device or the change thereof with respect to a calibration frequency.

13. A reader station comprising:

- a power transmitting element for transmitting power to a biosensor device;
- an antenna and a receiver for receiving of signals to be wirelessly transmitted from the biosensor device to the reader station with a transmitting frequency, and
- an analyser for analysing the transmitting frequency of the signal of the biosensor device or the change thereof with respect to a calibration frequency.